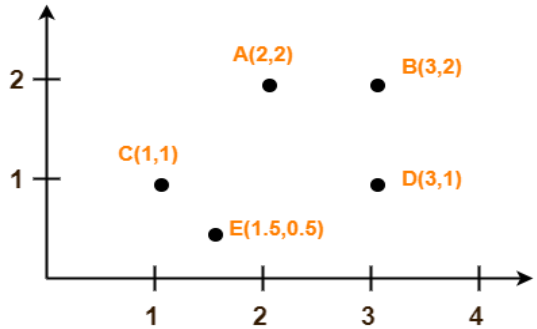
SVKM's
D. J. Sanghvi College of Engineering

Program: B.Tech in Information Technology **Academic Year: 2022** **Duration: 3 hours**
Date: 06.01.2023
Time: 10:30 am to 01:30 pm
Subject: Machine Learning (Semester VII) **Marks: 75**

Question No.		Max. Marks
Q1 (a)	i. Discuss the steps for designing a learning system. **OR** ii. Explain various types of Machine Learning Algorithm	[05] [05]
Q1 (b)	Explain various steps of Data preprocessing.	[10]
Q2 (a)	i. Discuss HMM in detail with suitable diagrams and Examples. **OR** ii. Write Applications of HMM	[05] [05]
Q2 (b)	Discuss various Kernel types and What are the different types of kernels used by SVM.	[10]
Q3 (a)	Explain the following terms: • feature space • hypothesis • inductive learning • bias • Variance	[05]
Q3 (b)	i. Calculate Precision, F1 score, Recall and accuracy for dataset with TP=30,TN=20, FP=10 and FN=15. **OR** ii. Use K-Means Algorithm to create two clusters  	[10] [10]
Q4 (a)	i. What do you mean by positive and negative Linear Regression? Explain with suitable diagram **OR** ii. Discuss mean square error(MSE) cost Function.	[05] [05]

<table>
<tr><td>Q4 (b)</td><td>Last year, five randomly selected students took a math aptitude test before they began their statistics course. The Statistics Department has three questions.
• What linear regression equation best predicts statistics performance, based on math aptitude scores?
• If a student made an 80 on the aptitude test, what grade would we expect her to make in statistics?
Given scores on the aptitude test=(95,85,80,70,60)...statistics grades.=(85,95,70,65,70)</td><td>[10]</td></tr>
<tr><td>Q5 (a)</td><td>Differentiate between Linear and logistic regression</td><td>[05]</td></tr>
<tr><td>Q5 (b)</td><td>i. Compute Decision Tree using ID3 Algorithm for following dataset
<table><tr><th>Day</th><th>Outlook</th><th>Temperature</th><th>Humidity</th><th>Wind</th><th>Play Tennis</th></tr><tr><td>1</td><td>Sunny</td><td>Hot</td><td>High</td><td>Weak</td><td>No</td></tr><tr><td>2</td><td>Sunny</td><td>Hot</td><td>High</td><td>Strong</td><td>No</td></tr><tr><td>3</td><td>Overcast</td><td>Hot</td><td>High</td><td>Weak</td><td>Yes</td></tr><tr><td>4</td><td>Rain</td><td>Mild</td><td>High</td><td>Weak</td><td>Yes</td></tr><tr><td>5</td><td>Rain</td><td>Cool</td><td>Normal</td><td>Weak</td><td>Yes</td></tr><tr><td>6</td><td>Rain</td><td>Cool</td><td>Normal</td><td>Strong</td><td>No</td></tr><tr><td>7</td><td>Overcast</td><td>Cool</td><td>Normal</td><td>Strong</td><td>Yes</td></tr><tr><td>8</td><td>Sunny</td><td>Mild</td><td>High</td><td>Weak</td><td>No</td></tr><tr><td>9</td><td>Sunny</td><td>Cool</td><td>Normal</td><td>Weak</td><td>Yes</td></tr><tr><td>10</td><td>Rain</td><td>Mild</td><td>Normal</td><td>Weak</td><td>Yes</td></tr><tr><td>11</td><td>Sunny</td><td>Mild</td><td>Normal</td><td>Strong</td><td>Yes</td></tr><tr><td>12</td><td>Overcast</td><td>Mild</td><td>High</td><td>Strong</td><td>Yes</td></tr><tr><td>13</td><td>Overcast</td><td>Hot</td><td>Normal</td><td>Weak</td><td>Yes</td></tr><tr><td>14</td><td>Rain</td><td>Mild</td><td>High</td><td>Strong</td><td>No</td></tr></table>
OR
ii. Explain DBSCAN Algorithm.</td><td>[10]

[10]</td></tr>
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